

## 2.1 limits

$$y = 3x^2 - 2x \quad \text{slope at } x_1 = 1$$

$$m_{\text{sec}} = \frac{3(1+h)^2 - 2(1+h) - 1}{h}$$

simplify

$$= \frac{3(1+2h+h^2) - 2 - 2h - 1}{h}$$

$$= \frac{\cancel{3} + 6h + 3h^2 - \cancel{2} - 2h - \cancel{1}}{h} = \frac{4h + 3h^2}{h}$$

$$m_{\text{sec}} = 4 + 3h$$

$$m_{\text{tan}} = \lim_{h \rightarrow 0} 4 + 3h = 4$$

$$y_1 = 1$$

$$x_2 = 1+h$$

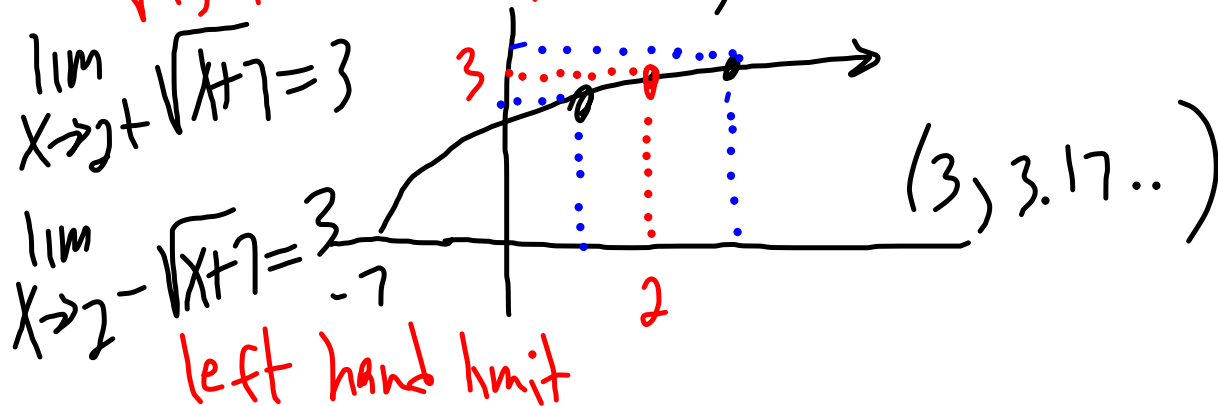
$$y_2 = 3(1+h)^2 - 2(1+h)$$

what does this mean?

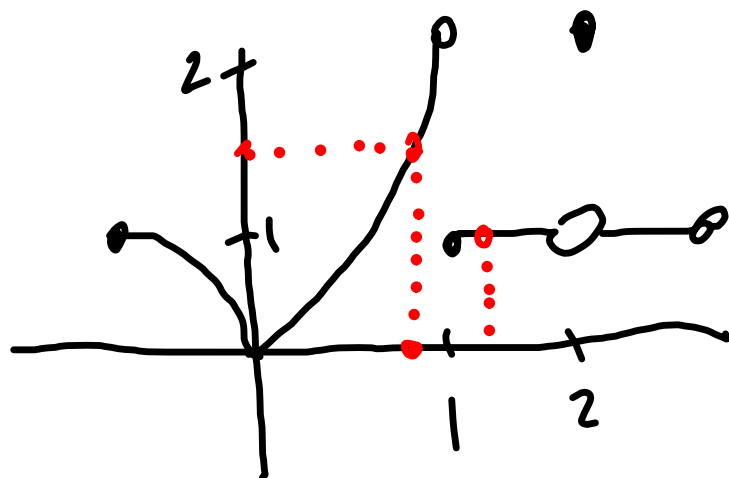
$$\lim_{x \rightarrow 2} \sqrt{x+7} = 3$$

as  $x$  approaches 2,  $\sqrt{x+7}$  approaches 3

when  $x$  is close to 2,  $\sqrt{x+7}$  is close to 3



38. d, e, f



$$\lim_{x \rightarrow 1^-} f(x) = 2 \quad \text{T}$$

$$\lim_{x \rightarrow 1^+} f(x) = \cancel{2} 1 \quad \text{T}$$

$$\lim_{x \rightarrow 1} f(x) = \text{dne} \quad \text{T}$$